

Revision to Idaho's Well Standards

**Good well standards are
critical to protect Idaho's
water resources.**

Why do we need good well standards?



- ❑ 96% of Idaho residents rely on groundwater.
- ❑ 5,000 wells are drilled each year.

In 2003—



HOW REVISIONS TO IDAHO'S WELL CONSTRUCTION STANDARD WILL PROTECT GROUNDWATER RESOURCES

PREPARED FOR AND SUBMITTED TO

Idaho Department of Water Resources
1301 N Orchard
Boise, ID 83706

June 10, 2003

482 CONSTITUTION • IDAHO FALLS, IDAHO 83402-3537 • (208) 524-2353 • FAX (208) 524-1795
www.rockymountainenvironmental.com

Available at <http://www.idwr.state.id.us/about/Well%20Standards/>

What is a well?

In Idaho, a "well" is an artificial excavation or opening in the ground more than eighteen (18) feet in vertical depth below land surface by which ground water of any temperature is sought or obtained.

Idaho Code (I.C.) §42-230(b)

What are not wells.

- ❑ Holes with total depth less than eighteen (18) feet.
- ❑ Holes for collecting soil or rock samples, determining geologic properties, or mineral exploration or extraction, including gravel pits.
- ❑ Holes for oil and gas exploration for which a permit has been issued pursuant to Section 47-320, Idaho Code.
- ❑ Holes for constructing building foundations or dewatering building or dam foundation excavations.
- ❑ Holes for the installation of standpipes or piezometers to monitor the saturation of dam embankments or foundations or to measure uplift forces on buildings, dams and other structures.

from IDAPA 37.03.10.010

Objectives of Phase 1:

1. Identify parts of the current rule that should be revised
 - to strengthen enforcement,
 - clarify the rule, and
 - protect Idaho's groundwater resources.
2. Lay the foundation to negotiate revisions to IDAPA 37.03.09.

Which stakeholders provided input and ideas to this report?

- ❑ Members of Idaho's Senate and House of Representatives;
- ❑ The Idaho Water Resources Board;
- ❑ Staff from four offices of IDEQ, from four offices of IDWR, and from four offices of the District Health Departments;
- ❑ Professional Engineers and all Professional Geologists residing in Idaho. (Over 1,300 notices were mailed.)

More stakeholders

- ❑ Idaho Association of Cities;
- ❑ Groundwater scientists at Idaho State University (ISU) and Idaho Water Resources Research Institute (IWRRI) at the University of Idaho (UI);
- ❑ Idaho rural water users;
- ❑ Well drillers licensed by the State of Idaho.
(154 announcements were mailed.)

Idaho's Well Drillers were actively involved

- ❑ Public stakeholder meetings in Coeur d'Alene, Idaho Falls, and Boise
- ❑ The Board of Directors, Idaho Ground Water Association
- ❑ The Driller's Advisory Committee (5 Well Drillers appointed by the Director IDWR)

What were major issues?

- ❑ *Well Seals – most controversial issue*
- ❑ *Well Abandonment*
- ❑ *Well Maintenance*
- ❑ *Septic Tanks*
- ❑ *Well Disinfection*
- ❑ *Clarification and Enforcement*

What are other recommendations?

- ❑ *Rules should be written in active voice.*
- ❑ *Place liability of anyone who causes a violation of the standards.*
- ❑ *Allow PVC casing .*
- ❑ *Require drill to recommend well completion.*
- ❑ *Require yield test.*
- ❑ *Require NSF, ASTM or API approved components.*
- ❑ *Recommend casing diameter based on anticipated yield.*

Phase 2: Negotiations to revise 37.03.09

- ❑ In Phase 2, stakeholders with various viewpoints and priorities meet face to face.
- ❑ Step-wise iterations using the University of Idaho's teleconferencing system.

Issue #1: Well Seals

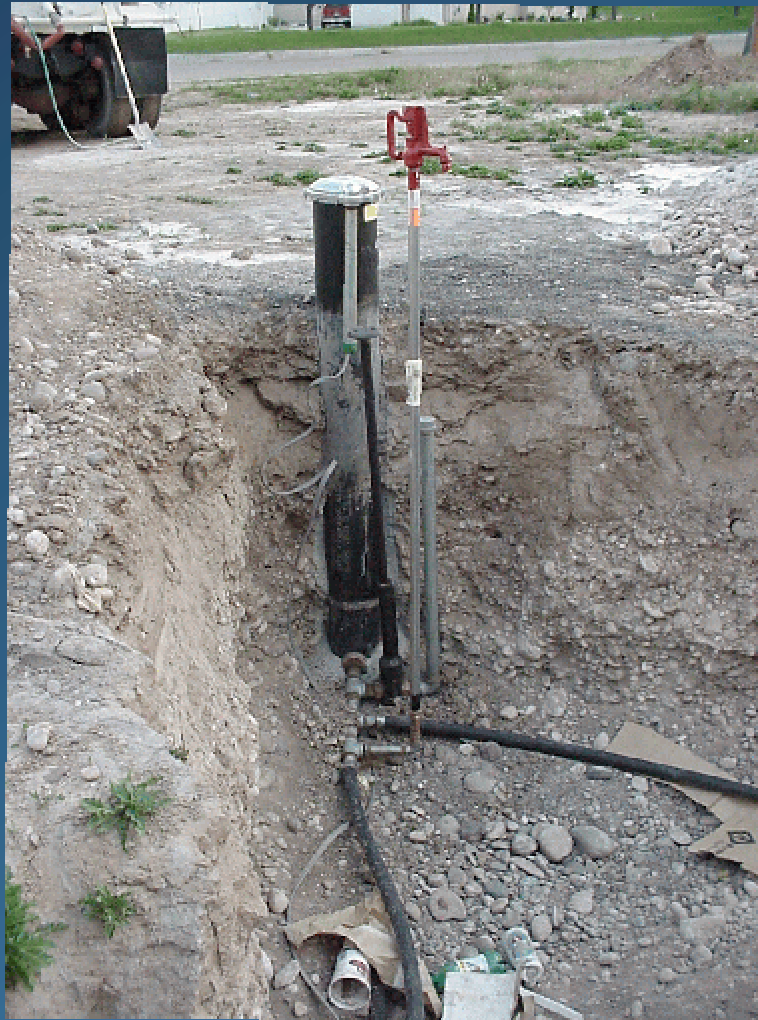
Seals will be the most challenging revision to IDAPA 37.03.09.

Changes may require new and different equipment.

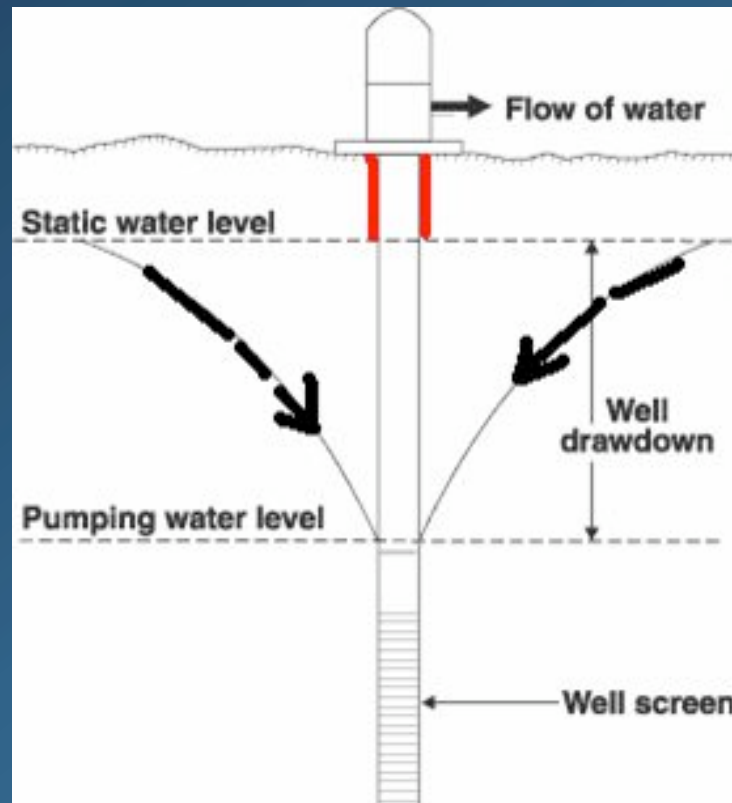
Surface water can transport bacteria to the aquifer.



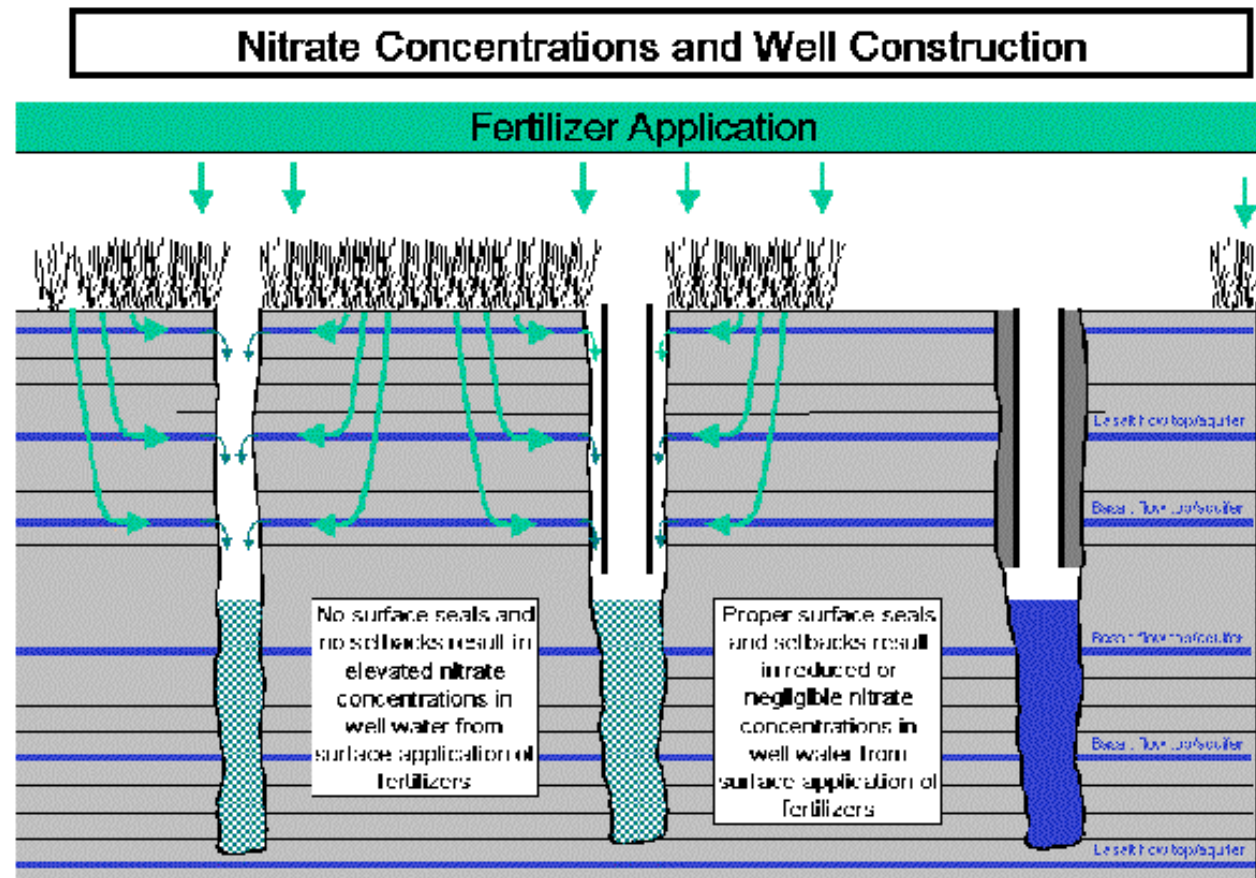
Good surface seal is important.



A seal above water level provides little protection.



An 18-ft seal may not prevent contamination of Idaho's water resources.

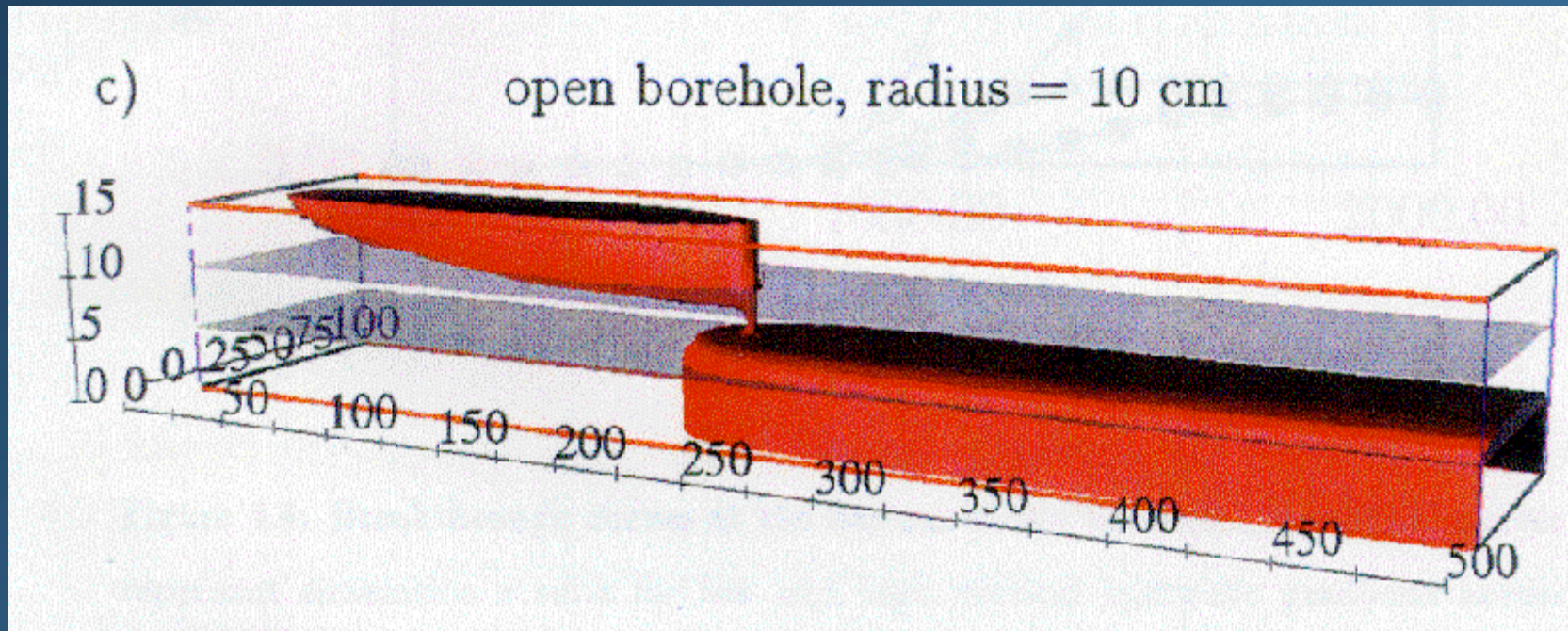


Stevens, G, Garwood, D. , and Ralston, D., 2003, Report of Geologic/hydrogeologic Services for City of Craigmont, Lewis County, Idaho: Completed by Idaho Water Resources Research Institute

Formation seals are critical.

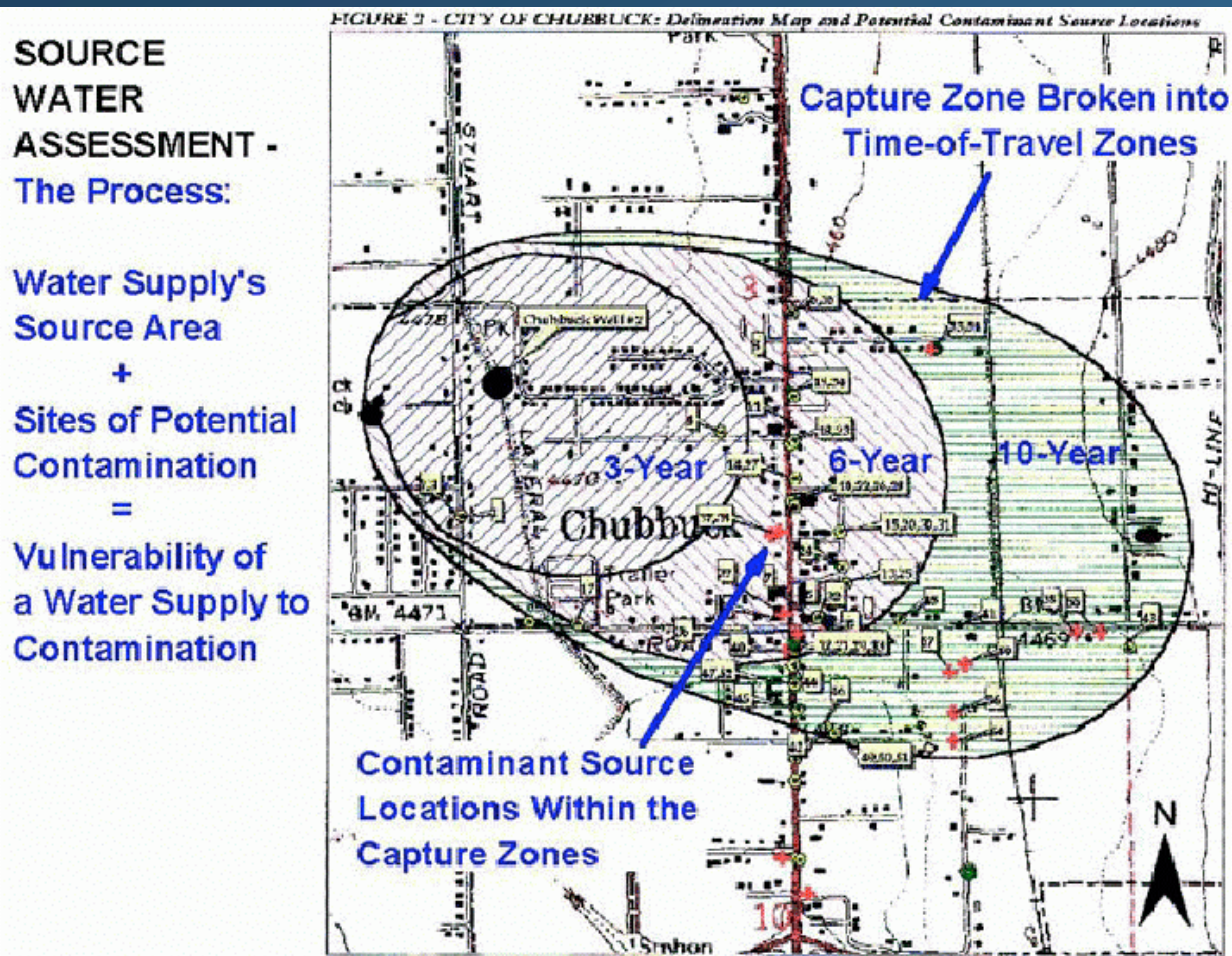
Unsealed boreholes short-circuit geochemical processes, spreading contaminants through the entire aquifer.

Open borehole allows entire plume to be transported into deeper aquifer.

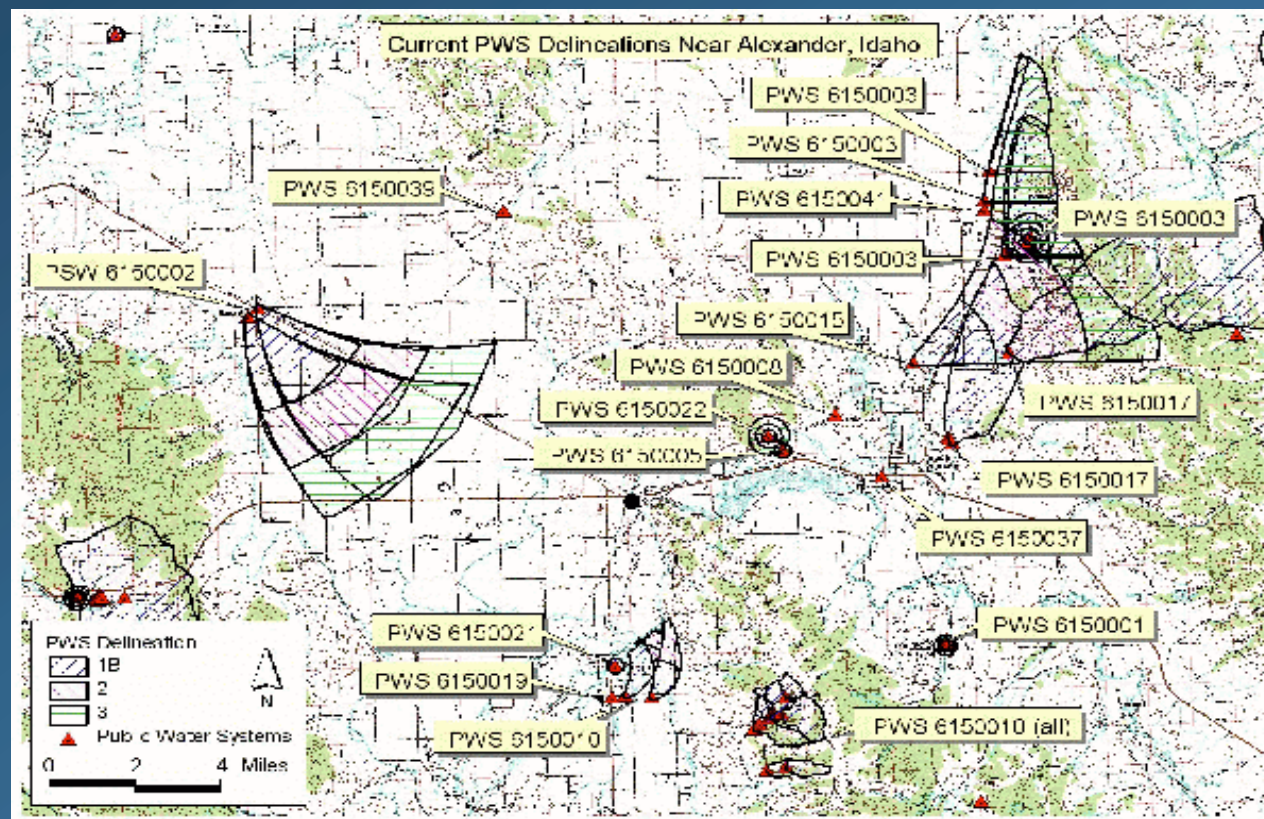


Lacombe, S. *et.al.*, 1995, Influence of leaky boreholes on cross- formation groundwater flow and contaminant transport: *Water Resources Research*, v. 31, no. 8, pp. 1871-1882

Because capture zones are extensive, wells must be properly sealed.



One poorly sealed well threatens the safety of water supplies, regardless of Well Head Protection and Source Water Assessment Plans.



Some stakeholders believe

- ❑ Seals should fill at least a 2 in. annulus.
- ❑ Surface seals should be set deeper than 18 ft;
- ❑ The *formation seal* may extend upward to the point that it becomes continuous with and indistinguishable from the surface seal.

Some stakeholders believe

- ❑ Each driller should be allowed to use their professional judgment on the depth to which seals should be installed.
- ❑ In many geologic settings, surface seals of any kind are meaningless.

Some stakeholders believe

A 1 in. seal, installed by pouring bentonite down the outside of the casing into the gap created by the drive shoe, is sufficient, if properly done.

Some drillers believe that driving casing while pouring dry crumbles will seal the well.



Some stakeholders believe

The *drill and drive* technique is adequate:

Groundwater movement between aquifers is not possible, because the *clay layers between aquifers squeeze closed* against the casing and prevent flow between.

Do higher standards protect public health and Idaho's aquifers?

The Eastern Idaho Regional Office, IDWR, established more stringent requirements to seal wells in the fractured rocks of Island Park.

Solid casing to the top of the producing aquifer.

2-in. seals installed by pressure injection to top of the producing aquifer.

Disinfection during drilling and when the well is complete.

Can the effect of higher standards be measured?

BEFORE-- 37% of the culinary wells were contaminated with coliform bacteria.

AFTER--less than 1/2% (0.5%) of new wells are contaminated.

Issue #2: Well Abandonment

IDAPA 37.03.09 describes well abandonment. There is no requirement to plug and abandon unneeded wells.

***Orphan wells are direct conduits
for contamination.***



In Phase 1 -- Stakeholders had conflicting views

Some owners need a second or backup well.

Improvements in wells seals are ineffective if there are open conduits everywhere in Idaho.

Issue #3: Well Repair and Maintenance

In 2003, Idaho's well drillers felt that they are unfairly blamed for contamination and that wells built to current standards produce safe, reliable water

In many cases, well owners

- ❑ *damage well casings, and*
- ❑ *move sources of contaminants too close to well heads.*

Well Repair and Maintenance

In many cases, well owners fail to maintain the integrity of the well.

Well drillers believe they are unfairly blamed when the pump installer infects an otherwise clean well or when an installer of the pitless adapter destroys the integrity of the casing and seal. Drillers also identified other practices, such as geo-loop wells, lack of backflow preventers, and compromised wellheads, all of which are beyond their control and pose a greater threat to groundwater resources than the drillers' practices.

Well Repair and Maintenance

In 2003, stakeholders identified *well owner responsibility* as part of IDAPA 37.03.09 that should be clarified and strengthened. Specifically, any revisions should require well owners to:

Protect the well from sources of contamination,

Repair the well immediately upon damage,

Plug orphan or unused wells or wells that are a threat to groundwater quality or public safety.

Well Repair and Maintenance

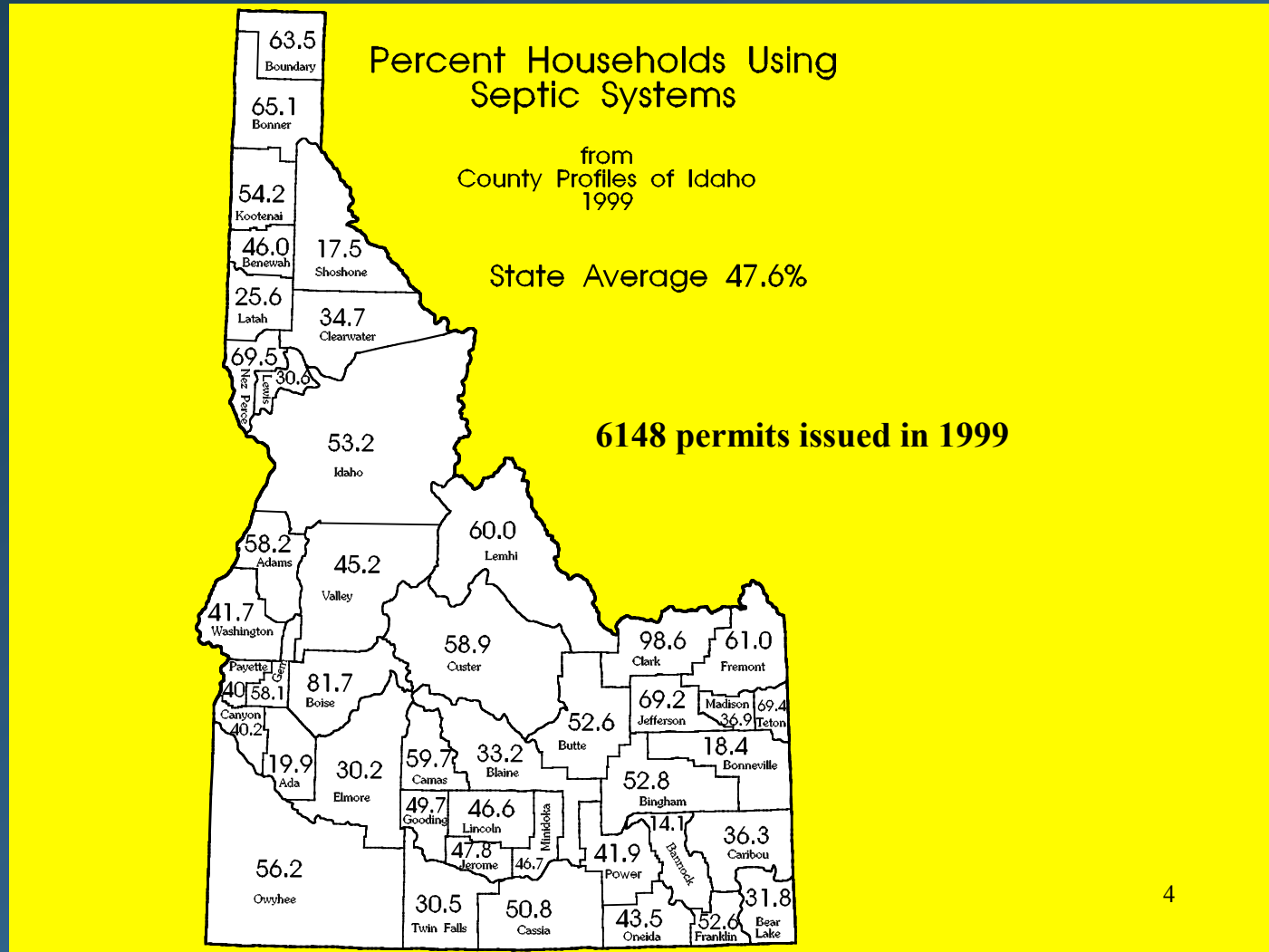


Issue #4: Well siting and septic tanks

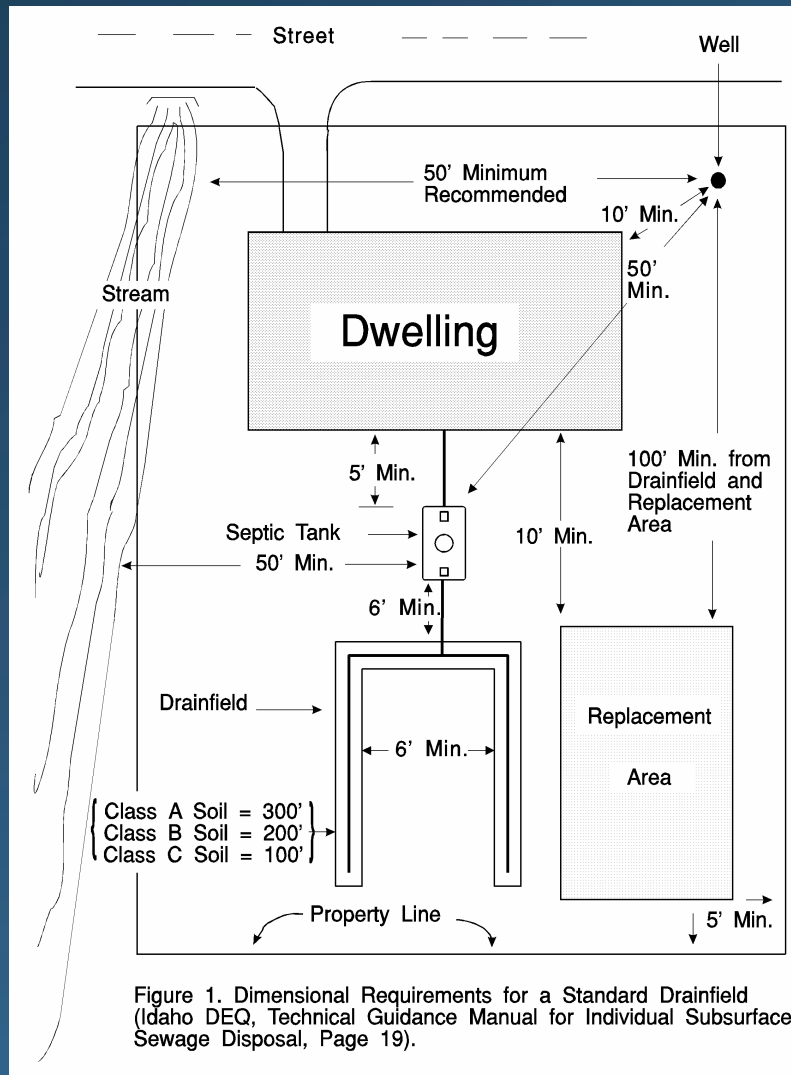
Currently IDAPA 37.03.09

- ❑ Does not list the distances that a well must be separated from sources of contamination.
- ❑ Refers the driller to rules of IDEQ and District Health Departments, adding to confusion.
- ❑ Provides no mechanism to resolve separation conflicts and does not clearly identify responsibility for compliance with set-back distances.

Well siting and septic tanks



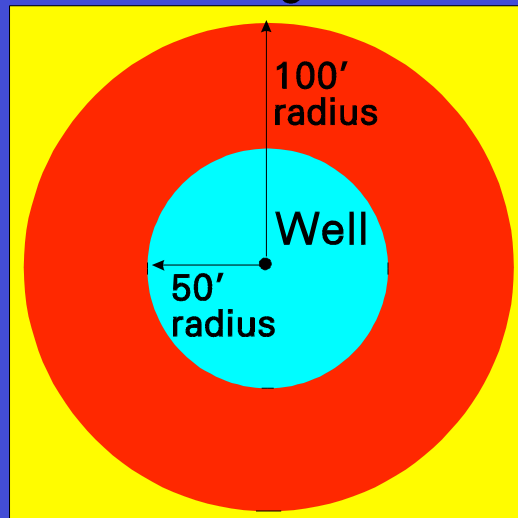
Well siting and septic tanks



The 100-ft setback between well and drain field creates an encumbrance on adjoining lots.

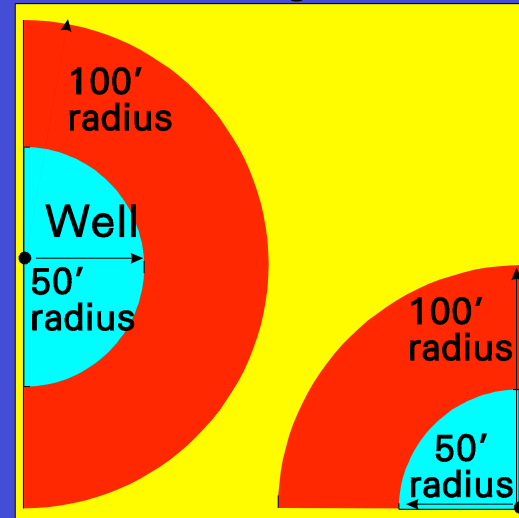
Well siting and septic tanks

Well Siting



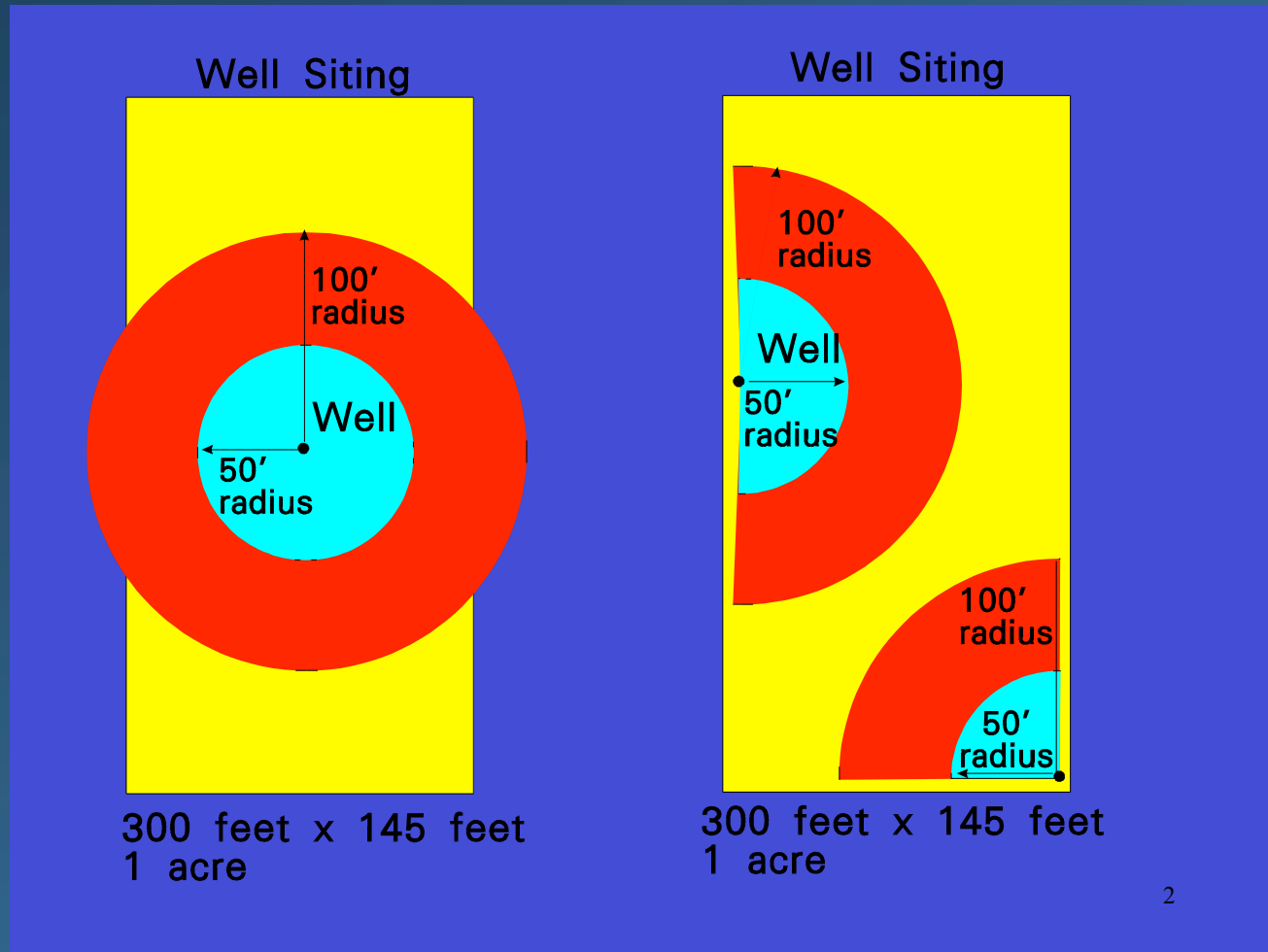
209 feet x 209 feet
1 acre

Well Siting



209 feet x 209 feet
1 acre

Well siting and septic tanks



Well siting and septic tanks

- ❑ District Health Departments (DHDs) believe that responsibility for resolution of the siting conflict should reside in the DHD.
- ❑ DHDs supervise the installation of 7,000 septic systems and perform 2,000 to 4,000 mortgage surveys each year.
- ❑ DHD staff are assigned to every county and have first-hand knowledge of local conditions.
- ❑ DHDs believe that well sites (or exclusion zones) should be added to the approval process.

Well siting: Driller perspective

Some drillers believe that they have no responsibility for well siting. They do not want to be delayed by siting issues when they are scheduling drilling. Other drillers concurred, saying they preferred to drill at a pre-determined location, where the homeowner [(or someone else) had selected the location and had assumed the liability for adequate separation.

Many drillers stated that siting conflicts should be resolved during subdivision approval by planning and zoning.

Well siting and septic tanks

In 2003, it was clear to almost all stakeholders that conflicts are largely an administrative or management problem.

Issue #5: Well Disinfection

IDAPA 37.03.09 currently recommends disinfection.

Any revision to the standard should require disinfection when a well is completed or a pump is re-installed.

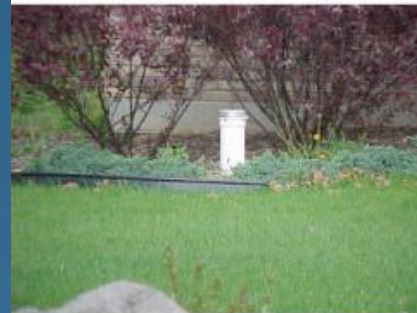
Well Disinfection

- ❑ The well should be disinfected when the pump is replaced (required in MT).
- ❑ The driller or pump installer should not be required to collect water samples for bacteriological testing; rather, specific procedures should be followed.

Well Disinfection

Provides step-by-step guidance for clean drilling and detailed procedures to disinfect water systems.

Water Well Disinfection Manual



*Water Division
Michigan Department of Environmental Quality
P.O. Box 30630
Lansing, Michigan 48909-8130
Phone 517-241-1377*

<http://www.michigan.gov/deq/>

Do higher standards protect public health and Idaho's aquifers?

The Eastern Idaho Regional Office, IDWR, established more stringent requirements to seal wells in the fractured rocks of Island Park.

- ❑ Solid casing to the top of the producing aquifer.
- ❑ 2-in. seals installed by pressure injection to top of the producing aquifer.
- ❑ Disinfection during drilling and when the well is complete.

Can the effect of higher standards be measured?

BEFORE -- 37% of the culinary wells were contaminated with coliform bacteria.

AFTER -- less than 1/2% (0.5%) of new wells are contaminated.

***Deeper seals and disinfection
have been proven to protect
public health and Idaho's
groundwater resources!***

Issue #6: Clarity and Enforcement

What are the roles and responsibilities of well drillers, well designers (if different), well owners, and pump installers?

Confusion arises when District Health Department or IDEQ rules are included by reference.

Clarity and Enforcement

Should IDAPA 37.03.09 be reorganized by

- ❑ the different types of wells, such as domestic, monitor, irrigation, or public water system wells?
- ❑ by geologic setting, such as sand and gravel, basalt, crystalline rock?

How should different standards be applied?

Clarity and Enforcement

Should IDAPA
37.03.09 be
revised for single-
family culinary
wells?



Clarity and Enforcement

**How should IDAPA
37.03.09 be revised
for monitor wells?
Direct-Push?**



Clarity and Enforcement

Most well drillers believe that Idaho's problems are caused by a *very few bad apples*.

They believe more enforcement by IDWR would solve any problem.